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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/530,365

07/13/2005

Yoshio Bando

2005-0516A

2995

513 7590 02/13/2008

WENDEROTH, LIND & PONACK, L.L.P.

2033 K STREET N. W.

SUITE 800

WASHINGTON, DC 20006-1021

EXAMINER

JAGAN, MIRELLYS

ART UNIT

PAPER NUMBER

2855

MAIL DATE

DELIVERY MODE

02/13/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/530,365	BANDO ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Mirellys Jagan	2855	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 and 13-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-12 and 17-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 7-12 and 17-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over the publication titled "Carbon nanothermometer containing gallium" by Gao et al [hereinafter Gao] in view of U.S. Patent 1,793,303 to Boyer.

Gao discloses a process for producing a temperature sensitive element comprising a carbon nanotube in which continuous and columnar gallium is included, wherein the length in

Art Unit: 2855

the axial direction of the columnar gallium in the carbon nanotube can be changed with a change in the temperature of an environment, the process comprising:

mixing gallium oxide powder and carbon powder into a uniform state;

subjecting the mixed powder to heating treatment at 900°C-1400°C (1,360°C) under an inert gas flow for a time period, thereby vaporizing the mixture; and

causing the vapor to react at a temperature of 800°C;

wherein the temperature sensitive element is produced at the same time the gallium is included in the carbon nanotube; the weight ratio of the gallium oxide powder to the carbon powder is from 6:1 to 15:1 (7.8:1); the carbon powder is amorphous activated carbon; the inert gas is nitrogen gas; a vertical high frequency induction heating furnace is used to conduct the heating treatment; the length in the axial direction of the carbon nanotube is from 1 to 10 microns (up to 10 microns); and the diameter of the nanotube is from 100 to 200 nm (100-150 nm).

Gao does not disclose the use of indium to make the oxide powder, and is silent as to the particular time period, therefore not explicitly disclosing that the time period of the heating treatment is one hour or more.

However, Boyer discloses a temperature responsive device that uses gallium or indium as temperature sensing materials. Boyer discloses that indium is an equivalent of gallium for temperature sensing purposes since they both expand and contract as a function of temperature (see page 1, lines 28-37, 54-56; and page 2, lines 115 and 116).

Referring to claim 7, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Gao by using indium instead of gallium

Art Unit: 2855

when making the oxide for the temperature sensitive composition since Boyer teaches that indium and gallium are equivalent materials that will perform the same function of sensing temperature.

Referring to claims 12 and 24-27, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Gao and Boyer by conducting the heat treatment for an hour or more since this particular heating time period is considered to be an optimum amount of heating time that can be determined using routine experimentation based on the need to ensure proper heating treatment in order to produce the indium-based temperature sensitive element.

#### ***Response to Arguments***

4. Applicant's arguments have been fully considered but they are not persuasive.

Applicant's arguments that Gao and Boyer fail to disclose the temperature sensitive element being produced at the same time the indium is included in the carbon nanotube are not persuasive because Gao discloses mixing the oxide powder and carbon powder into a uniform state when producing the temperature sensitive element, which means that the temperature sensitive element is produced at the same time the oxide is included in the carbon nanotube. Furthermore, Boyer teaches that indium and gallium are equivalent temperature sensing materials, which suggests to a person skilled in the art that a process which would be successful with gallium would also be successful with indium.

***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mirellys Jagan whose telephone number is (571) 272-2247. The examiner can normally be reached on Monday-Friday from 12PM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gail Verbitsky/  
Primary Examiner, Art Unit 2855

MJ  
February 11, 2008